Thermo Scientific HyPerforma Single-Use Mixer

The next generation of efficiency and performance

The next-generation Thermo Scientific™ HyPerforma™ Single-Use Mixer (S.U.M.) provides you with enhanced functionality, ease of use and efficiency. The complete HyPerforma S.U.M. system consists of a mixer tank with a motor controller, available in sizes of 50, 100, 200, 500, 1,000 and 2,000L with a 5:1 turndown mixing ratio. The redesigned HyPerforma S.U.M. maintains traditional stirred-tank mixer design principles with a directly-coupled motor impeller drive assembly and a cylindrical tank with a specific height-to-diameter ratio, allowing for quick turnaround time for liquid-to-liquid mixing and powder-to-liquid mixing.

Critical upstream application steps

- Media preparation.
- Final formulation steps.
- Buffer preparation.
- Harvest vessels.
- Large-volume mixing (up to 2,000L).

Critical downstream application steps

- Pooling and liquid transfer.
- Product suspension.
- Mixing and storing multiple batches.
- Buffer preparation.
- Viral inactivation.

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HyPerforma S.U.M. options

- Powder hanger for 1kg, 5kg and 25kg powder bags.

- AC and DC motor options; electrical box only available on AC option.

- 3x load cell weighing system with summing box (options for displaying signal output).

- Cable management system to organize process tubing lines.

- Available in either water-jacketed or non-jacketed (no heat transfer) design.

- pH and conductivity probes and display.

- Open-top or closed-top Thermo Scientific™ BioProcess Container™ (BPC) design.

- BPC available in Thermo Scientific™ CX5-14 Film and Aegis™5-14 Film options.

Options outside of the above list may be reviewed with a Thermo Fisher Scientific sales representative and considered for customizations to the standard mixer design.
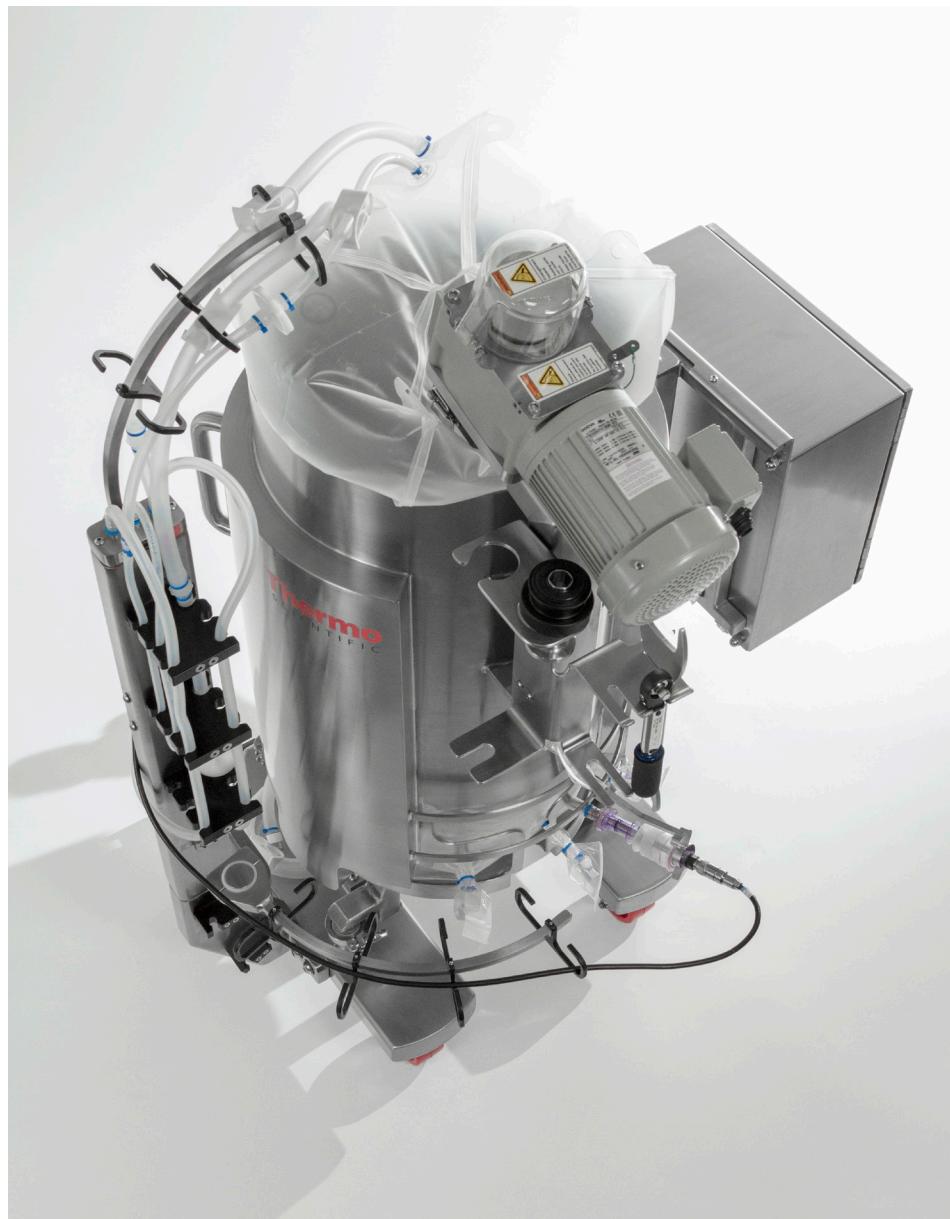
Ordering information

| Standard S.U.M. hardware units	Size	Cat. No.
Non-jacketed, DC motor, without load cell	50L	SUM0050.9001
Jacketed, DC motor, without load cell	50L	SUM0050.9002
Non-jacketed, 120VAC, AC motor, without load cell	50L	SUM0050.9003
Jacketed, 120VAC, AC motor, without load cell	50L	SUM0050.9004
Non-jacketed, 240VAC, AC motor, without load cell	50L	SUM0050.9005
Jacketed, 240VAC, AC motor, without load cell	50L	SUM0050.9006

Note: Models without water jackets may have slightly different dimensions than the water-jacketed model shown here. See the drawings provided with your unit for exact dimensions for non-jacketed models. Non-jacketed models do not have the capability to heat or cool the liquid inside the tank.

Design features of the 50L, 100L and 200L S.U.M.
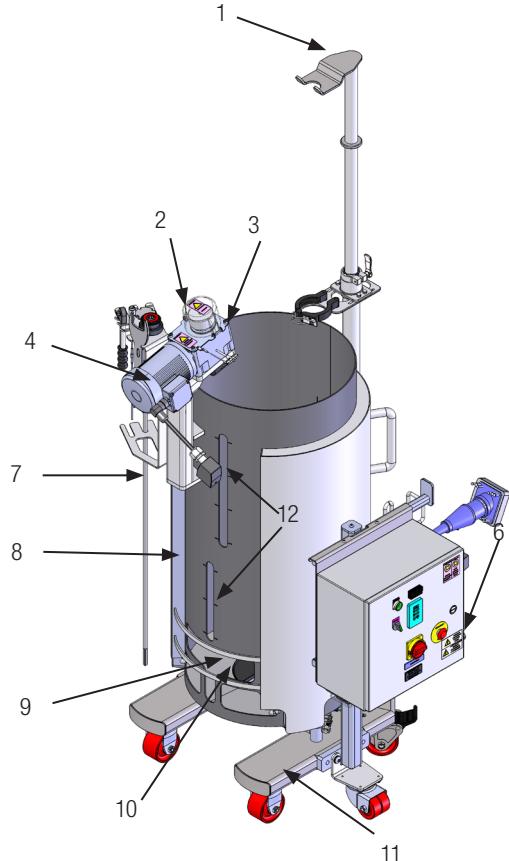
Front view of 50L, 100L and 200L water-jacketed S.U.M.

1. Powdertainer arm (optional)
2. Mixing assembly with shield
3. Bearing port receiver with clamp
4. Mixer motor
5. Stainless steel (grade 304) outer support container
6. Electrical control panel (optional)
7. Drive shaft (stored)
8. $\frac{3}{8}$-inch dimpled jacket (side and bottom)
9. Probe access window
10. Probe hanger bracket
11. Cart assembly
12. Liquid sight windows
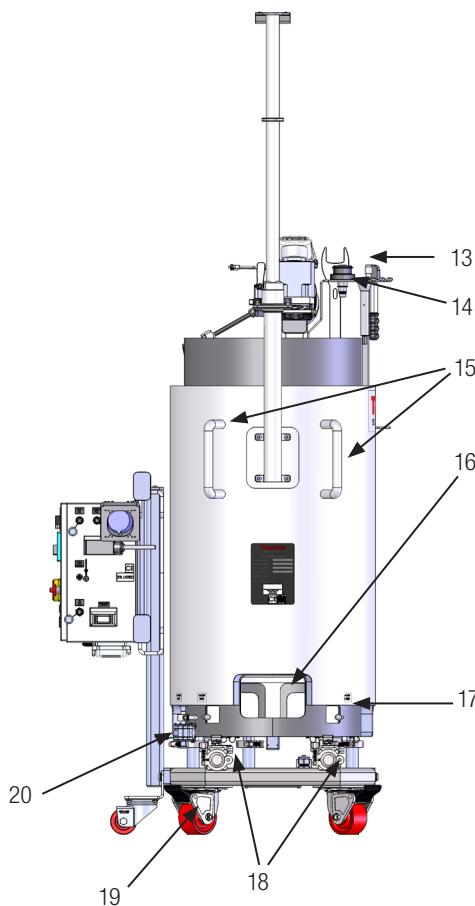
Back view of 50L 100L, and 200L water-jacketed S.U.M.

13. Standard tool set: $\frac{3}{8}$-inch, 150 in.-lb. square torque wrench, load cell and motor cap lockout wrench
14. Bearing hub (for open-top mixing only)
15. Handles
16. Cutout for BPC loading
17. Bottom cutouts/pins for BPC attachment and alignment
18. 1½-inch tri-clamp connection ports for water inlet/ outlet (water-jacketed models only)
19. Casters (3 swiveling and 2 fixed)
20. Bleed valve (water-jacketed models only)

Note: Models without water jackets include the same features as water-jacketed models shown here, but without the jacket and inlet/outlet ports.
Optional load cells and cable management system are not shown. See the accessories section for more information about these items.

Standard 50L S.U.M. dimensions — water-jacketed model

59cm (23.2 in.)
Cart width

35cm (13.8 in.)
Electrical box
width

58cm (22.8 in.)
Cart length

80cm (31.4 in.)
Overall length

94cm (37.0 in.)
Overall width

Top view

216cm (84.9 in.) Powdertainer height

153cm (60.1 in.) Motor height

121cm (47.6 in.) Tank height

47cm (18.6 in.) Tank bottom

19cm (7.6 in.) Cart height

0cm (0 in.)
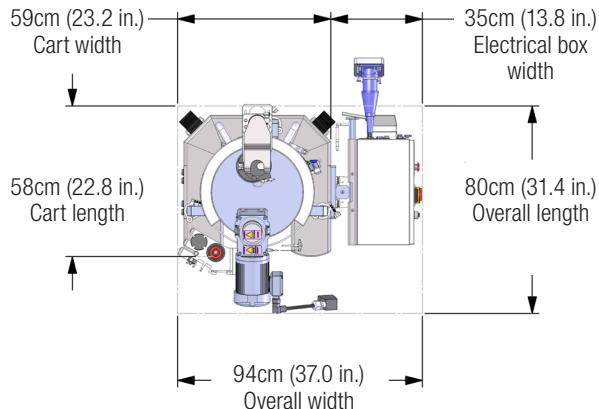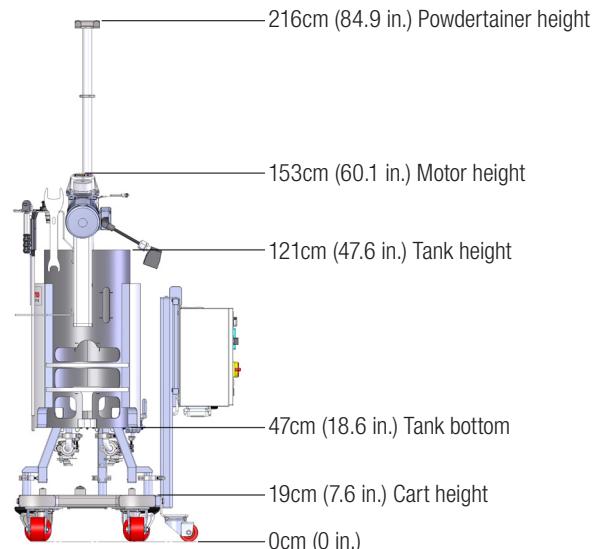
Front view

Standard 50L S.U.M. hardware

		50L S.U.M. specifications			
		AC motor		**DC motor**	
		Non-jacketed	**Jacketed**	**Non-jacketed**	**Jacketed**
Fluid jacket	Jacket area: full/half volume	–	0.38 m² (4.1 ft²)/0.32 m² (3.4 ft²)	–	0.38 m² (4.1 ft²)/0.32 m² (3.4 ft²)
	Jacket volume	–	2L (0.53gal)	–	2L (0.53gal)
	Jacket flow rate at 50 psi	–	99L/min (26.4gal/min)	–	99L/min (26.4gal/min)
	Process connection	–	1-inch sanitary tri-clamp	–	1-inch sanitary tri-clamp
	TCU model: Maximum heating/cooling	–	TF2500: 2,800/2,500W	–	TF2500: 2,800/2,500W
	Approximate liquid heat-up time (5–37°C)	–	1.2 hr	–	1.2 hr
	Approximate liquid chill-down time (37–5°C)	–	2.7 hr	–	2.7 hr
Misc.	RTD or thermocouple, 1/8 in. (3.18mm) OD	RTD: Pt-100 (standard)			
Support container	Overall width	94.2cm (37.1 in.) with e-box		56.5cm (22.25 in.) without e-box	
	Overall length	84.3cm (33.2 in.) with e-box		77cm (30.3 in.) without e-box	
	Overall height	198.6cm (78.2 in.)			
	Dry skid weight (mass)	152kg (335lb.)	171kg (376lb.)	152kg (335lb.)	171kg (376lb.)
	Wet skid weight, rated working volume (mass)	202kg (445lb.)	221kg (486lb.)	202kg (445lb.)	221kg (486lb.)
General	Ceiling height required for standard drive shaft loading	228.6cm (90 in.)			
	Electrical power supply requirement (voltage, phase, current)	120/240V, single phase, 10A		Dependent on controller	
	pH and dissolved oxygen (DO) probe, autoclavable type (AppliSens™, Broadley James™, Mettler Toledo™)	12mm diameter x 215–235mm insertion length x 13.5PG (pipe) thread			
Recommended operating parameters	Operating temperature range	2–40°C ±0.1°C (36–104°C ±0.2°F)			
	Motor speed	30–350rpm			
	Volume range	10–50L			
	Maximum bag pressure	0.03 bar (0.5psi)			
	Continuous operating time	21 days mixing time at nominal volume only			

Ordering information

| 50 L BPC	Size	Probe ports[†]	Film type	Cat. No.
Standard powder – liquid BPC	50L	0	CX5-14	SH30768.01
Standard powder – liquid BPC	50L	0	Aegis5-14	SH30973.01
Standard liquid – liquid BPC	50L	0	CX5-14	SH30767.01
Standard liquid – liquid BPC	50L	0	Aegis5-14	SH30983.01
Standard powder – liquid BPC[†]	50L	3	CX5-14	SH31055.02
Standard powder – liquid BPC[†]	50L	3	Aegis5-14	SH31051.02
Standard liquid – liquid BPC[†]	50L	3	CX5-14	SH31055.04
Standard liquid – liquid BPC[†]	50L	3	Aegis5-14	SH31051.01

[†]All 50L BPCs with probe ports are designed to allow probes to work properly at 5:1 turndown levels. These BPCs are only compatible with the HyPerforma hardware shown in this document. If you are using an older version of the S.U.M. hardware, do not use these items, but refer to the legacy S.U.M. user manual or data sheets.

Standard 50L BPC for powder–liquid applications without probe ports

Line	Description	Tubing set (inner diameter x outer diameter x length)	End treatment
1	Bottom drain	12.7mm (½ in.) x 19.1mm (¾ in.) C-Flex™ x 122cm (48 in.)	Capped 12.7mm (½ in.) MPX body
2	Addition line	12.7mm (½ in.) x 19.1mm (¾ in. C-Flex x 122cm (48 in.)	Plugged 12.7mm (½ in.) MPX insert
3	Recirculation/sample line	12.7mm (½ in.) x 19.1mm (¾ in.) C-Flex x 137cm (54 in.) splits to 12.7mm (½ in.) x 19.1mm (¾ in.) C-Flex x 61cm (24 in.) and 12.7mm (½ in.) x 19.1mm (¾ in.) C-Flex x 30cm (12 in.)	Capped 12.7mm (½ in.) MPX insert Plugged 12.7mm (½ in.) MPX body
4	Powder addition port	76 mm (3 in.) sanitary fitting, tri-clamp	Cap with gasket

Standard 50L BPC for liquid–liquid applications without probe ports

Line	Description	Tubing set (inner diameter x outer diameter x length)	End treatment
1	Bottom drain	12.7mm (½ in.) x 19.1mm (¾ in.) C-Flex x 122cm (48 in.)	Capped 12.7mm (½ in.) MPX body
2	Fill line	12.7mm (½ in.) x 19.1mm (¾ in.) C-Flex x 122cm (48 in.)	38.1mm (1½ in.) tri-clamp (SterilEnz™)
3	Vent filter	6.4mm (¼ in.) x 12.7mm (½ in.) C-Flex x 10.2cm (4 in.)	Sterile hydrophobic vent filter (0.2 µm PVDF, Acro™ 50)
4	Recirculation/sample line	12.7mm (½ in.) x 19.1mm (¾ in.) C-Flex x 137cm (54 in.) splits to 12.7mm (½ in.) x 19.1mm (¾ in.) C-Flex x 61cm (24 in.) and 12.7mm (½ in.) x 19.1mm (¾ in.) C-Flex x 30cm (12 in.)	Capped 12.7mm (½ in.) MPX insert Plugged 12.7mm (½ in.) MPX body
5	Addition line	9.5mm (⅜ in.) x 15.9mm (⅝ in.) C-Flex x 61cm (24 in.)	Plugged 9.5mm (⅜ in.) MPX insert

Standard 50L BPC for powder–liquid applications with probe ports

1. Recirculation line

Impeller

5. Thermowell/small-volume sample

3–4. Probe ports (2)

2. Addition line

Front face

6. Bottom drain

Back face

7. Powder addition port
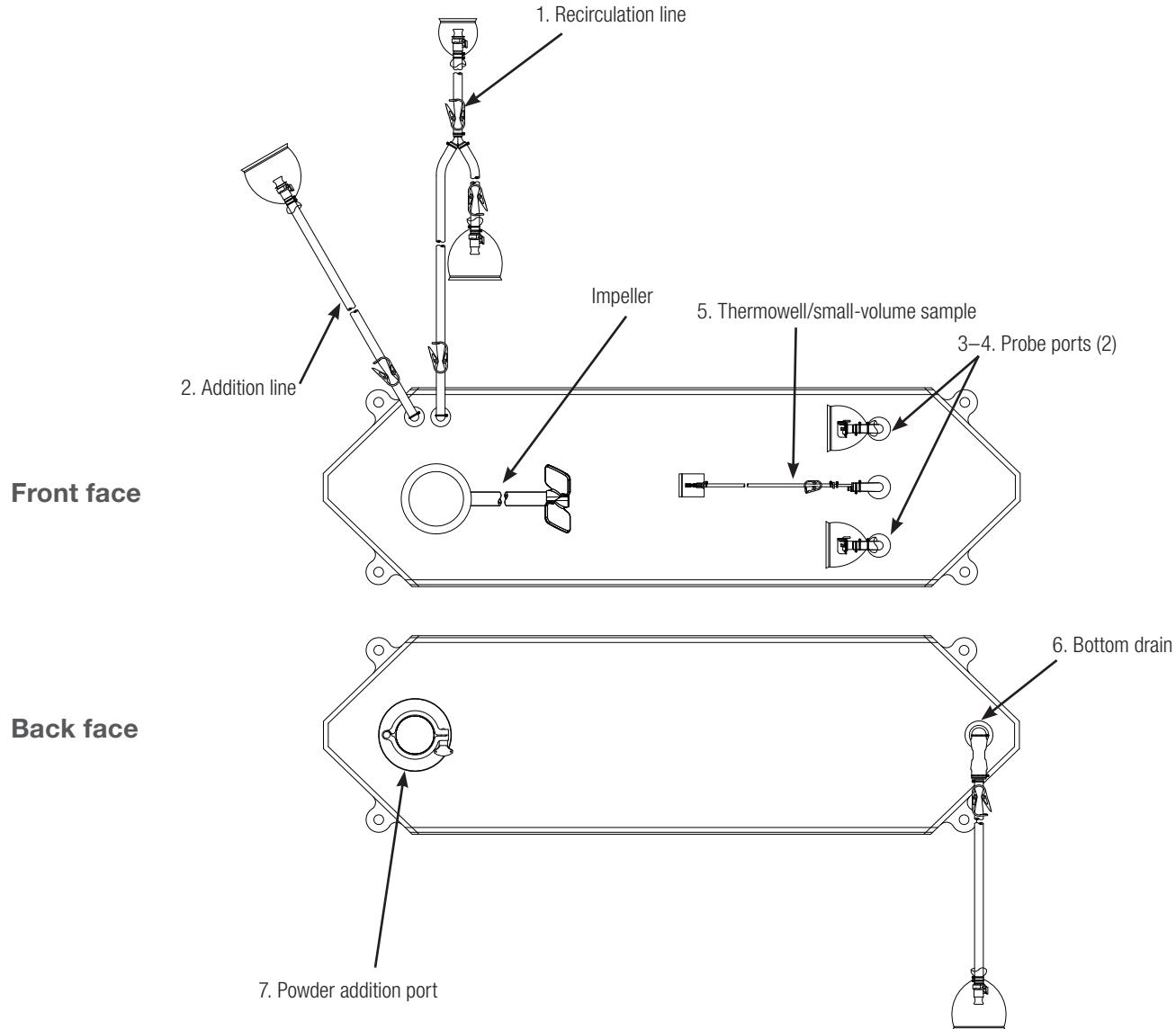
Line	Description	Tubing set (inner diameter x outer diameter x length)	End treatment
1	Recirculation line	12.7mm (½ in.) x 19.1mm (¾ in.) C-Flex x 122cm (48 in.) splits to 12.7mm (½ in.) x 19.1mm (¾ in.) C-Flex x 61cm (24 in.) and 12.7mm (½ in.) x 19.1mm (¾ in.) C-Flex x 30cm (12 in.)	Capped 12.7mm (½ in.) MPX insert Plugged 12.7mm (½ in.) MPX body
2	Addition line	12.7mm (½ in.) x 19.1mm (¾ in.) C-Flex x 122cm (48 in.)	Plugged 12.7mm (½ in.) MPX insert
3–4	Probes ports (2)	None	Kleenpak™ aseptic connector KPCHT series (female)
5	Thermowell/ small-volume sample	3.2mm ($\frac{1}{8}$ in.) x 6.4mm (¼ in.) C-Flex x 30cm (12 in.)	Luer and SmartSite™ valve port
6	Bottom drain	12.7mm (½ in.) x 19.1mm (¾ in.) C-Flex x 122cm (48 in.)	Capped 12.7mm (½ in.) MPX body
7	Powder addition port	76mm (3 in.) sanitary fitting, tri-clamp	Cap with gasket

Standard 50L BPC for liquid–liquid applications with probe ports

Front face

Impeller

1–2. Probe ports (2)

3. Thermowell/small-volume sample

6. Fill line

5. Recirculation line

4. Bottom drain

Back face

8. Addition line

7. Vent filter
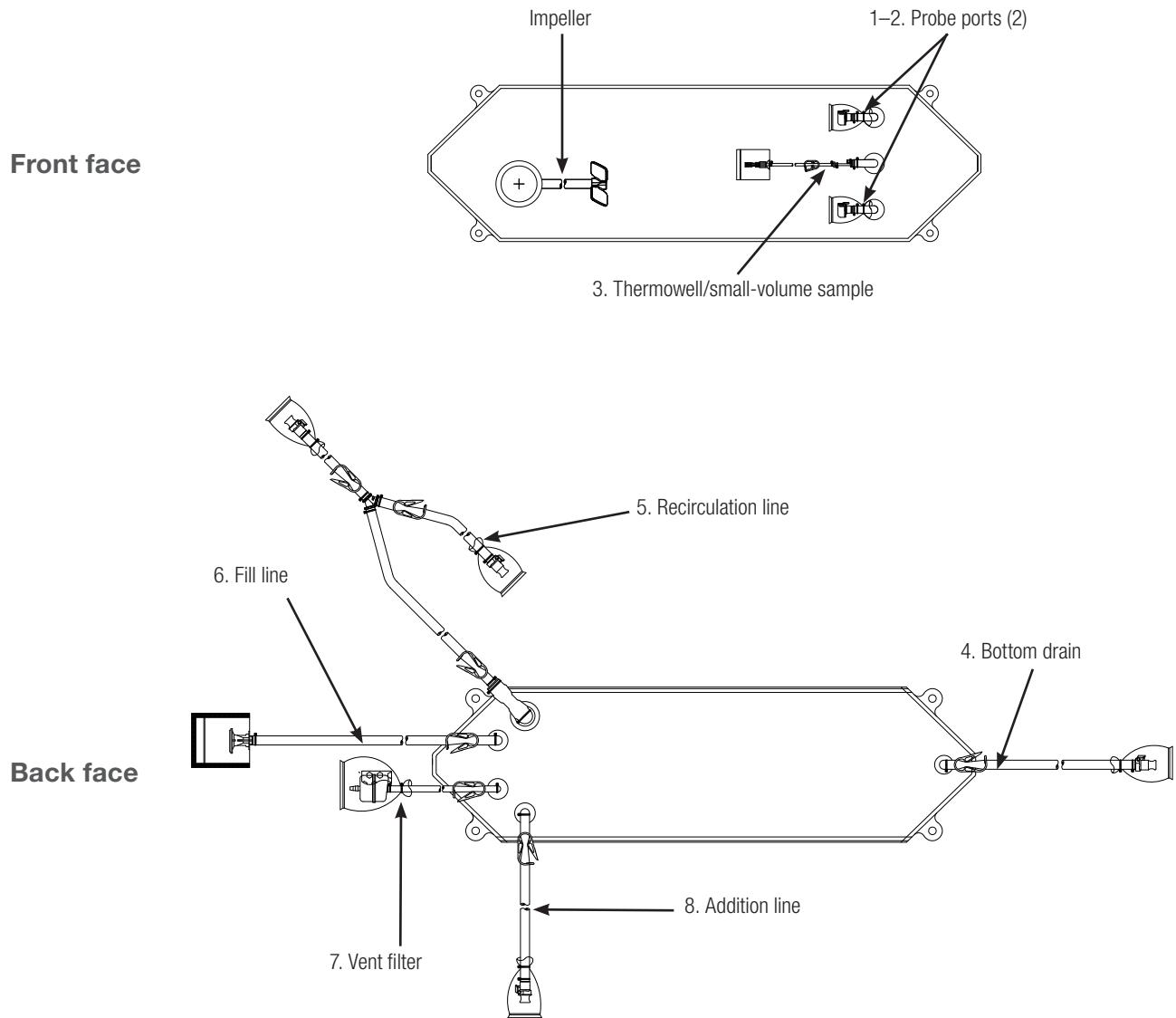
Line	Description	Tubing set (inner diameter x outer diameter x length)	End treatment
1–2	Probes ports (2)	None	Kleenpak aseptic connector KPCHT series (female)
3	Thermowell/small-volume sample	3.2mm (⅛ in.) x 6.4mm (¼ in.) C-Flex x 30cm (12 in.)	Luer and SmartSite valve port
4	Bottom drain	12.7mm (½ in.) x 19.1mm (¾ in.) C-Flex x 122cm (48 in.)	Capped 12.7mm (½ in.) MPX body
5	Recirculation line	12.7mm (½ in.) x 19.1mm (¾ in.) C-Flex x 122cm (48 in.) splits to 12.7mm (½ in.) x 19.1mm (¾ in.) C-Flex x 61cm (24 in.) and 12.7mm (½ in.) x 19.1mm (¾ in.) C-Flex x 30cm (12 in.)	Capped 12.7mm (½ in.) MPX insert Plugged 12.7mm (½ in.) MPX body
6	Fill line	12.7mm (½ in.) x 19.1mm (¾ in.) C-Flex x 122cm (48 in.)	38.1mm (1½ in.) tri-clamp (SterilEnz)
7	Vent filter	6.4mm (¼ in.) x 12.7mm (½ in.) C-Flex x 10.2cm (4 in.)	Sterile hydrophobic vent filter (0.2μm PVDF, Acro 50)
8	Addition line	9.5mm (⅜ in.) x 15.9mm (⅝ in.) C-Flex x 61cm (24 in.)	Plugged 9.5mm (⅜ in.) MPX insert

Standard open-top liners and impeller sleeves

Bottom drain
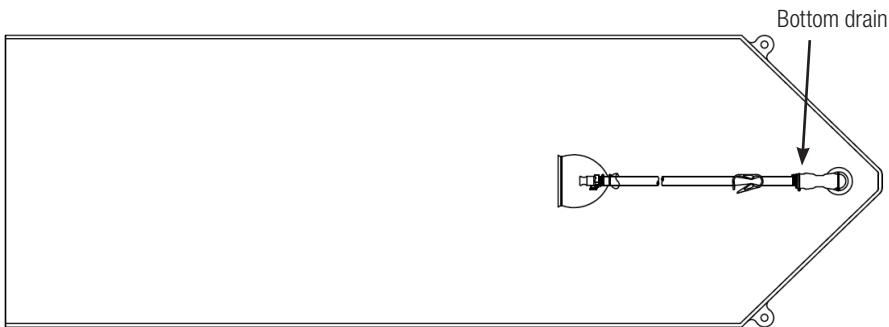
Ordering information

Description	Size	Probe ports	Film type	Cat. No.
Standard open-top liner	50L	0	CX3-9	SH30762.04

Quick-connect fitting

Sleeve (¾ in. inner diameter tubing)
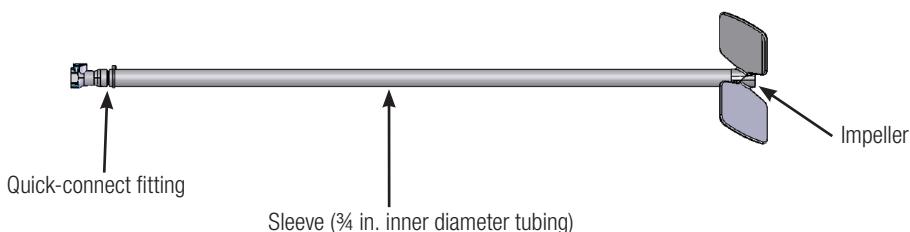
Impeller

Ordering information

Description	Size	Cat. No.
Impeller sleeve for open-top mixing[†]	50L	SH30749.06

[†]The bearing hub needed for open-top mixing is automatically supplied with the tank hardware.

Custom BPC products

Category	Options/capability	Notes
Tubing type	C-Flex, platinum-cured silicone, PVC, PharMed™, PharmaPure™.	More information is available in the tubing selection guide.
Tubing size	Ranges from 3.18mm (⅛ in.) to 25.4 mm (1 in.) inner diameter in various lengths.	More information is available in the tubing selection guide.
Connectors	Luer, Colder Products Company (CPC) quick connects, SIP connectors, tri-clamp, Kleenpak, SmartSite, Clave™, Lynx™ steam-thru, CPC steam-thru, Gore™ steam valve, Gore™ Mini TC, BioQuate, SterilEnz, end plug.	More information is available in the connection system selection guide. Note: the only option for probe port connections is Kleenpak.
Probe ports/line addition ports	Ports may be added if they are compatible with the hardware.	The reusable probe port connection uses a Kleenpak connector.
Disposable sensors	Pressure sensor: PendoTECH and Finesse Solutions (PendoTECH comes standard on 500L and 1,000L S.U.M.); DO and pH sensor: Finesse Solutions and PreSens; pH sensor: Mettler Toledo.	Choice of qualified vendors available.
Port sizes	Limited engineer-to-order customization only.	Dependent on location in bag and fit with hardware (e.g., 1-inch ID port on harvest line).
Rearrangement of lines on existing ports	Limited customization possible, such as moving sample/thermo-well port to a probe tube port, or swapping exhaust outlet line with liquid lines.	Dependent on location in bag and fit with hardware.
Dip tube lines	Limited customization possible.	Length cannot interfere with impeller and shaft.
Filters on media and supplement inlets	Limited engineer-to-order customization only. Choice of filters used to sterilize incoming media or supplements are available.	

Note: Not all options are available for all ports. It is not possible to customize port type, port location, chamber dimensions or mixing assembly.
For additional information, please see the selection guides in the BPC Catalog.

BPC packaging

Outer packaging	Supplied "flat-packed" with two polyethylene outer layers
Label	Description, product code, lot number, expiry date on outer packaging and shipping container
Sterilization	Irradiation (25 to 38kGy) inside outer packaging
Shipping container	Durable cardboard carton
Documentation	Certificate of analysis provided with each lot for each delivery

HyPerforma S.U.M. options

Cable management system

Ordering information

Description	Size	Cat. No.
Cable management system	50L, 100L	SV50992.01

Channels for
addition lines

Adjustable arm

Harvest line hook
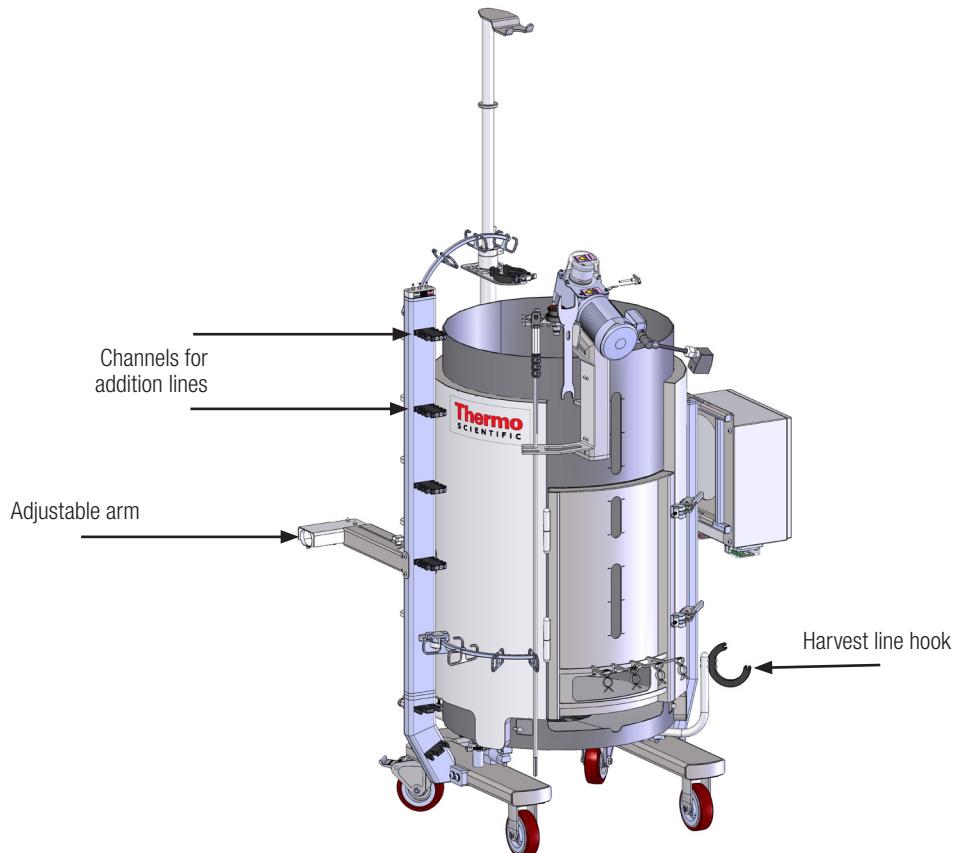
Load cell options

Load cells are typically radially mounted in sets of three. The mounting location varies slightly for each size in order to allow easy access to the bottom drain or sparging mechanisms and tubing.

Mettler Toledo MTB load cell for 50L–1,000L S.U.M. units.

Ordering information

Description	Size	Cat. No.
3x load cell with summing box without display	50L, 100L	SV50988.01

Load cell displays

Harsh mount load cell displays are available as an option for all HyPerforma S.U.M. systems. They are normally mounted on the electrical box or a wall and are available with four different interfaces.

Mettler Toledo IND331 harsh mount load cell display for all S.U.M. systems.

Ordering information

Description	Interface	Cat. No.
Mettler Toledo IND331 display, harsh mount style with 120VAC US line cord/plug	Analog (STD)	SV50177.306
Mettler Toledo IND331 display, harsh mount style with 120VAC US line cord/plug	Allen-Bradley™ RIO	SV50177.307
Mettler Toledo IND331 display, harsh mount style with 120VAC US line cord/plug	Device net	SV50177.308
Mettler Toledo IND331 display, harsh mount style with 120VAC US line cord/plug	Ethernet/IP and Modbus TCP	SV50177.309
Mettler Toledo IND331 display, harsh mount style with 120VAC US line cord/plug	Profibus	SV50177.310

Powdertainer arm

A Powdertainer arm is available as an option for powder–liquid applications. It holds the container of powder above the mixer and attaches it to the BPC with a clamp. The arm adjusts vertically and swivels to enable convenient lifting of the powdertainer onto the hanger.

Powdertainer hook

Powdertainer-to-BPC port clamp

Tank attachment mechanism
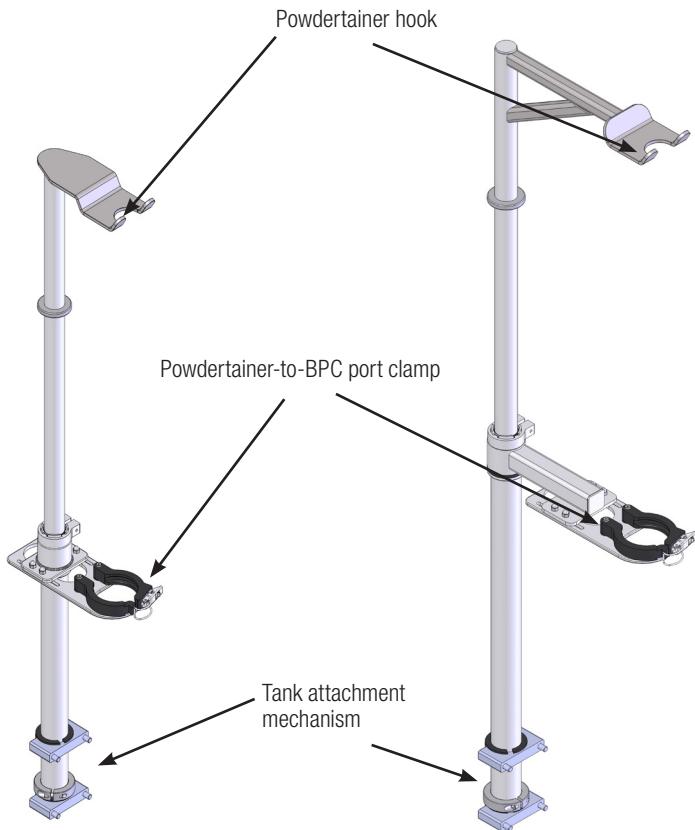
Ordering information

Description	Size	Cat. No.
Powdertainer arm for 50L–1,000L mixers	50L–1,000L	SV51002.01

pH and conductivity monitoring devices

Mettler Toledo pH and conductivity sensors with a display monitor are available in single pH, dual pH, and pH and conductivity configurations. The monitor is mounted on the post behind the electrical box and includes a color touch screen and control and alarm management features.

Ordering information

Description	Cat. No.
Mettler Toledo pH monitoring device, single channel	SV51004.01
Mettler Toledo pH monitoring device, dual channel	SV51004.02
Mettler Toledo pH and conductivity monitoring device, dual channel	SV51004.07

Autoclave tray and probe assembly

The autoclave tray holds the electrochemical probes and bellows in place during the autoclave sterilization process. Design elements include the following:

- Fabricated from stainless steel.

- Plastic handle provides for easy transport right out of the autoclave.

- Positions probes on 15% incline for greater probe and membrane longevity.

- Restrains probe bellows from collapsing during sterilization.

- Probe holder accommodates two probes.

Threaded probe attachment

Cable tie

Molded bellows cover

Handle

Probe assembly
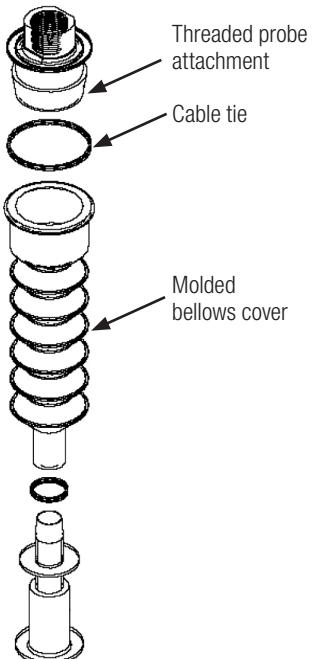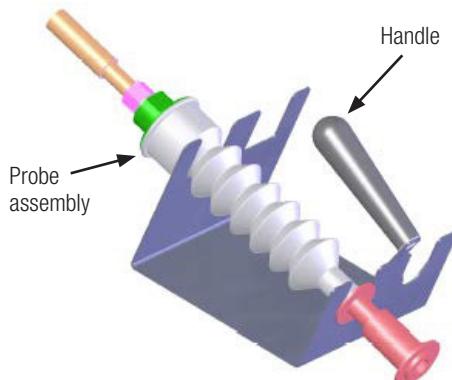
Probe clips

Stainless steel probe clips are used to hold the probes in place on the S.U.M. tank. The independently moveable probe clips hang on a thin brace above the probe port tank cutout and are held in place by an adjustable spring plunger. The probes are inserted into the clip mechansim and held in place by a half-spring clip.

Ordering information

Description	Cat. No.
Autoclave tray	SV50177.01
4 probe clips	SV50177.23

Heavy-duty tubing clamps

Heavy-duty clamps are used for pinching off line sets that are not in use in order to prevent process fluids from escaping. Prior to sterile probe insertion, tubing clamps must be in place to close off probe ports.

Ordering information

Description	Cat. No.
Heavy-duty tubing clamp (single)	SV20664.01
Heavy-duty tubing clamps (10-pack)	SV20664.04

Configuration table for made-to-order S.U.M. hardware

Single-Use Mixer	SUM	####.	X	X	X	X	X	X	X	X	X	X	X	X

Vessel size

0050, 0100, 0200, 0500, 1000 or 2000 (4 digits in liters, followed by a dot)

1. Vessel type/material

A = Non-jacketed (304 SST) (standard) tank and cart are 304 SST

B = Jacketed (304 SST) (standard) tank and cart are 304 SST

C = Non-jacketed (316 SST) tank and cart are 316 SST

D = Jacketed (316 SST) tank and cart are 316 SST

2. Motor/electrical enclosure/mount

A = DC motor/no electrical enclosure

B = AC motor/no electrical enclosure

C = AC motor/120VAC electrical enclosure, right-hand configuration (standard)

D = AC motor/240VAC electrical enclosure, right-hand configuration (standard)

E = AC motor/120VAC electrical enclosure, left-hand configuration

F = AC motor/240VAC electrical enclosure, left-hand configuration

3. Drive shaft

A = 1-piece drive shaft (SST)

B = 2-piece drive shaft (SST)

C = 3-piece drive shaft (SST)

4. RTD

0 = No RTD

A = Single RTD, Pt-100, 60 in. Bulgin connector (standard)

B = Dual RTD, Pt-100, 120 in. DB9 connector x 120 in. open lead wires

C = Dual RTD, Pt-100, 120 in. Bulgin x 120 in. Bulgin connectors

D = Dual RTD, Pt-100, 120 in. DB9 x 60 in. Bulgin connectors

E = Dual RTD, Pt-100, 120 in. Bulgin x 120 in. LEMO connectors

F = Single RTD, Pt-100, 120 in. Bulgin connector

G = Dual RTD, Pt-100, 120 in. DB9 x 120 in. Bulgin connectors

H = Single RTD, Pt-100, 60 in. LEMO connector

5. Load cells and display

0 = No load cells

A = Loads cells, no display

B = Loads cells, wall mount display, analog output communication

C = Loads cells, wall mount display, Allen-Bradley communication

D = Load cells, wall mount display, device net communication

E = Loads cells, wall mount display, Modbus communication

F = Loads cells, wall mount display, Profibus communication

6. Powder arm assembly

0 = No powder arm assembly

A = Powder arm assembly

7. Cable management tree

0 = No cable management tree

A = Cable management tree, left-hand configuration

B = Cable management tree, right-hand configuration

8. Communication cable

0 = No communication cable

A = Communication cable

9. Monitoring device

0 = No monitoring device

A = pH monitoring device, single channel with display

B = pH monitoring device, dual channel with display

C = pH and conductivity monitoring device with display

10. Probe clip

0 = No probe clip

A = Probe clip (quantity of 4)

11. P&ID tags (predefined tags and locations, not custom)

0 = No P&ID tags

A = Standard P&ID tag option (predefined, not custom)

12. Pressure relief valve

0 = No pressure relief valve

A = Pressure relief valve (max pressure set at 75psi)

B = Pressure relief valve with pressure indicator (max pressure set at 75psi)

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In the United States:
For customer service, call 1-800-766-7000
To fax an order, use 1-800-926-1166
To order online: thermofisher.com

In Canada:
For customer service, call 1-800-234-7437
To fax an order, use 1-800-463-2996
To order online: thermofisher.ca

Find out more at **thermofisher.com/sum**

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